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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,114	03/30/2004	Luiz M. Franca-Neto	884.B70US1	5166
21186	7590	04/25/2008	EXAMINER	
SCHWEGMAN, LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			TORRES, JUAN A	
			ART UNIT	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/814,114	FRANCA-NETO, LUIZ M.	
	<b>Examiner</b>	<b>Art Unit</b>	
	JUAN A. TORRES	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 11 April 2008.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-4,7-11,13-15,18,19,22 and 27 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4,7-11,13-15,18,19 and 22 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 30 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____.   | 6) <input type="checkbox"/> Other: _____ .                        |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 08/25/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Specification***

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph.

The disclosure is objected to because of the following informalities:

- a) The recitation in page 3 line 18 "10GHz" is improper, because it is improperly constructed (see page 3 line 25); it is suggested to be changed "10 GHz"
- b) The recitation in page 5 line 11 "7GHz" is improper, because it is improperly constructed (see page 3 line 25); it is suggested to be changed "7 GHz"
- c) The recitation in page 8 lines 7-8 "FIG. 4 is a block diagram of various apparatus 400, 440 and systems 476" seems to be improper, because it is improperly constructed (see figure 4 and page 8 lines 12 and 20); it is suggested to be changed "FIG. 4 is a block diagram of various apparatus 400, 444 and systems 476" (emphasis added)

Appropriate correction is required.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The title has been changed to "Multi-Tone Communications Apparatus, Systems, and Methods"

***Allowable Subject Matter***

The indicated allowability of claim 11 is withdrawn in view of the newly discovered reference(s) to Walker (US 20040048574 A1).

- . Rejections based on the newly cited reference(s) follow.

***Response to Arguments***

Applicant's arguments with respect to claims 1, 15 and 19 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 recites the limitation "prior to the comparing" in line 5-6. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 15, 18 and 27 are rejected under 35 U.S.C. 102(a) as being anticipated by Rogerson (US 20030099299 A1).

Regarding claims 15 and 27, Rogerson discloses translating a first bit stream into a multi-tone communications signal having a substantially simultaneous multi-tone signaling bandwidth of greater than about 20 percent of an associated carrier frequency (figure 16 blocks 200 and 300 paragraph [0076] and [0082], see figure 4 for multi-tone and figure 26 for one implementation); translating the first bit stream into a second bit stream having data presented as one or more groups of substantially simultaneous bits (figure 8 block T100 and figure 9 every n-tuples correspond to 4 bits paragraph [0089] and figure 16 block 200 paragraph [0126]); and translating the second bit stream into the multi-tone communications signal comprising a number of substantially simultaneous tones not greater than a maximum number of the substantially simultaneous bits (figure 2 uses 3 tones for transmitting the n-tuples).

Regarding claim 18, Rogerson discloses claim 15, Rogerson also discloses shifting the first bit stream to provide the second bit stream (figure 18 block 400 and figure 19, paragraphs [0134]-[0135]).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogerson (US 20030099299 A1) in view of Walker (US 20040048574 A1) (Rogerson is co-inventor).

Regarding claim 1, Rogerson discloses a multi-bit encoder coupled to a multi-tone generator to provide a multi-tone communications signal having a substantially simultaneous multi-tone signaling bandwidth of greater than about 20 percent of an associated carrier frequency wherein the multi-tone generator is to generate a plurality of tones responsive to data from the multi-bit encoder (figure 16 blocks 200 and 300 paragraph [0076] and [0082], see figure 4 for multi-tone and figure 26 for one implementation). Rogerson doesn't disclose that a number of tones greater than a number of possible states of the data. Walker discloses that a number of tones greater than a number of possible states of the data (paragraph [0087], BPSK modulation has 2 levels). Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of ultra-wide band communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the BPSK modulation disclosed by Walker. The suggestion/motivation for doing so would have been to use an effective modulation for low SNR (BPSK is one of the strongest modulation techniques that can work with low SNR).

Regarding claim 2, Rogerson and Walker disclose claim 1, Rogerson also discloses to receive a first bit stream and to provide a second bit stream having data

presented as one or more groups of substantially simultaneous bits (figure 8 block T100 paragraph [0089] and figure 16 block 200 paragraph [0126]).

Regarding claim 3, Rogerson and Walker disclose claim 2, Rogerson also discloses a shift register (figure 18 block 400 and figure 19, paragraphs [0134]-[0135]).

Regarding claim 4, Rogerson and Walker disclose claim 1, Rogerson also discloses a master oscillator and at least one slave oscillator (figure 27 blocks 360 and 3400 and figure 19, paragraph [0147]).

Regarding claims 19 and 22, Rogerson discloses receiving a multi-tone communications signal at a plurality of phasor detectors to determine a presence of a number of substantially simultaneous tones included in a multi- tone communications signal (figure 48 block 412 paragraph [0181] and figures 44-58); amplifying the multi-tone communications signal using an approximately equal gain prior to the comparing (figure 48 block 550 and figures 44-58); comparing a combined amount of measured signal in at least one of the number of substantially simultaneous tones to a threshold value (figure 45-48 edge detector block 450 with comparator 540 and figures 44-58); receiving multiple indications of the presence of the plurality of tones from a plurality of phasor detectors (figure 48 input block 420 paragraph [0177] and figures 44-58); and determining a received data output corresponding to the multiple indications (figure 48 block 420 paragraph [0177] and figures 44-58). Rogerson doesn't disclose that the signal is an orthogonal signal and that the antenna is an omnidirectional antenna. Walker discloses that the signal is an orthogonal signal (figure 24, paragraph [0087], QAM modulation). Rogerson and Walker teachings are analogous art because they are

from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the QAM modulation discloses by Walker. The suggestion/motivation for doing so would have been to use high data rates

Claims 7-11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogerson (US 20030099299 A1) in view of Walker (US 20040048574 A1) (Rogerson is co-inventor), and further in view of O'Neill (US 5559866 A).

Regarding claim 7, Rogerson discloses a plurality of phasor detectors to determine a presence of a plurality of tones included in a multi-tone communications signal by comparing a combined amount to a threshold value (figure 48 block 412 paragraph [0181] and figures 44-58); and a distribution module couple to an antenna and to provide the multi- tone communications signal to the plurality of phasor detectors (figure 48 input block 412 paragraph [0181] and figures 44-58). Rogerson doesn't disclose that the signal is an orthogonal signal and that the antenna is an omnidirectional antenna. Walker discloses that the signal is an orthogonal signal (figure 24, paragraph [0087], QAM modulation). Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the QAM modulation discloses by Walker. The suggestion/motivation for doing so would have been to use high data rates. O'Neill discloses the use of an omnidirectional antenna

(abstract). Rogerson, Walker and O'Neill teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson and Walter the omnidirectional antenna discloses by O'Neill. The suggestion/motivation for doing so would have been to receiver the signal with equal gain in all directions reducing the complexity of the receiver.

Regarding claim 8, Rogerson, Walker and O'Neill disclose claim 7, Walter also discloses a quadrature detector (figure 24, paragraph [0087], QAM modulation). Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the QPSK modulation discloses by Walker. The suggestion/motivation for doing so would have been to use high data rates.

Regarding claim 9, Rogerson, Walker and O'Neill disclose claim 7, Walter also discloses a sine component and a cosine component (figure 24, paragraph [0087], QAM modulation). Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the QPSK modulation discloses by Walker. The suggestion/motivation for doing so would have been to use high data rates.

Regarding claim 10, Rogerson, Walker and O'Neill disclose claim 7, Rogerson also discloses an amplifier having an averaging automatic gain control to receive the

multi-tone communications signal from a distribution module and to apply a substantially equal gain to the plurality of tones (figure 48 block 550 and figures 44-58).

Regarding claim 11, Rogerson discloses a multi-bit encoder coupled to a multi-tone generator to provide a first multi-tone communications signal having a substantially simultaneous multi-tone signaling bandwidth of greater than about 20 percent of an associated carrier frequency (figure 16 blocks 200 and 300 paragraph [0076] and [0082], see figure 4 for multi-tone and figure 26 for one implementation); a plurality of phasor detectors to determine a presence of a plurality of tones included in a second multi-tone communications signal by comparing a combined amount of measured signal to a threshold value (figure 48 block 412 paragraph [0181] and figures 44-58); and a distribution module couple to an antenna and to provide the multi- tone communications signal to the plurality of phasor detectors (figure 48 input block 412 paragraph [0181] and figures 44-58). Rogerson doesn't disclose that the signal is an orthogonal signal and that the antenna is an omnidirectional antenna. Walker discloses that the signal is an orthogonal signal (figure 24, paragraph [0087], QAM modulation). Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the QAM modulation discloses by Walker. The suggestion/motivation for doing so would have been to use high data rates. O'Neill discloses the use of an omnidirectional antenna (abstract). Rogerson, Walker and O'Neill teachings are analogous art because they are from the same field of endeavor of wireless communications. At the time of the

invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson and Walker the omnidirectional antenna discloses by O'Neill. The suggestion/motivation for doing so would have been to receiver the signal with equal gain in all directions reducing the complexity of the receiver.

Regarding claim 13, Rogerson, Walker and O'Neill disclose claim 11, Rogerson also discloses a determination module to receive multiple indications of the presence of the plurality of tones from the plurality of phasor detectors and to determine a received data output corresponding to the multiple indications (figure 48 block 420 paragraph [0177] and figures 44-58).

Regarding claim 14, Rogerson, Walker and O'Neill disclose claim 11, Rogerson also discloses the plurality of 5 tones (figure 4). Walker discloses a number of 2 possible states of the data (paragraph [0087], BPSK modulation has 2 levels), so the number of tones is at least two times greater than a number of possible states of data in the second multi-tone communication signal. Rogerson and Walker teachings are analogous art because they are from the same field of endeavor of ultra-wide band communications. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate in the system disclosed by Rogerson the BPSK modulation discloses by Walker. The suggestion/motivation for doing so would have been to use and effective modulation for low SNR (BPSK is one of the strongest modulation techniques that can work with low SNR).

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a) IEEE 802.11a standard (Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, High-speed Physical Layer in the 5 GHz Band, 1999) pages 7-27 discloses a multitone system using different modulations schemes.
- b) Branlund (US 20030086366 A1) discloses adaptive communications methods for multiple user packet radio wireless networks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUAN A. TORRES whose telephone number is (571)272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres  
04/22/2008

/Juan A Torres/  
Examiner, Art Unit 2611